

AMENDMENT TO THE CLAIMS:

Please cancel Claims 17-34 without prejudice or disclaimer, and add new rewritten Claims 35-62 as follows:

Claims 1-34 (canceled)

Claim 35 (new): A free-space optical (FSO) laser communication system capable of automatically stabilizing variations in the detected intensity of laser beam carrier signals, caused by atmospheric turbulence along signal reception channels supported within said FSO laser communication system, said FSO laser communication system comprising:

at least first and second communication terminals in optical communication by way of a broad-band FSO laser beam communication link supporting signal transmission and reception channels;

wherein each said communication terminal has a transmitter module and a receiver module; and

wherein each said receiver module includes

a receiving aperture for receiving a FSO laser beam carrier signal transmitted from said transmitter module of another one of said communication terminals;

a fast steering mirror (FSM) for steering said FSO laser beam carrier signal along an optical pathway having downstream direction;

a beam splitter, disposed downstream from said FSM, for splitting said FSO laser beam carrier signal into a first signal component and a second signal component;

a receiving optical fiber, disposed at the end of said optical pathway, for receiving the second component of said FSO laser beam carrier signal after transmission along said optical pathway;

a single-cell signal detector in optical communication with said receiving optical fiber, for detecting the intensity of said second component of said FSO laser beam carrier signal and generating an electrical signal corresponding thereto;

a multi-segment signal detector, disposed downstream from said beam splitter, for detecting the intensity of said first signal component of said FSO laser beam carrier signal, and generating electrical signals corresponding thereto;

a processor for automatically analyzing signals generated from said multi-segment signal detector, controlling said FSM, and automatically tracking or following a maximum intensity laser beam speckle in said FSO laser beam carrier signal, and moving away from low intensity (i.e. black) laser beam speckles appearing in said FSO laser beam carrier signal and that might fall onto said receiving optical fiber, and thereby achieving a first level of optical signal intensity stabilization at said single-cell signal detector in said receiver module;

a spatial modulator for spatially modulating said second component of said FSO laser beam carrier signal;

said processor further analyzing electrical signals produced by said single-cell signal detector, controlling said spatial modulator, and spatially modulating said second component of said FSO laser beam carrier signal so as to lock a maximum intensity speckle appearing in the received second component of said FSO laser beam carrier signal, onto said receiving optical fiber, and thereby achieving a second level of optical signal intensity stabilization at said single-cell signal detector in said receiver module.

Claim 36 (new): The FSO laser communication system of claim 35, wherein said signal transmission and reception channels are optically-separated.

Claim 37 (new): The FSO laser communication system of claim 35, wherein said signal transmission and reception channels are optically-combined.

Claim 38 (new): The FSO laser communication system of claim 35, wherein said receiving aperture comprises a telescopic receiving aperture.

Claim 39 (new): The FSO laser communication system of claim 35, wherein said transmitter module and said receiver module are realized as separate modules.

Claim 40 (new): The FSO laser communication system of claim 35, wherein said transmitter module and said receiver module are realized as a single transceiver module.

Claim 41 (new): The FSO laser communication system of claim 35, wherein said spatial modulator is a spatial phase modulator.

Claim 42 (new): The FSO laser communication system of claim 41, wherein said spatial phase modulator is realized as a spatial phase modulation panel having a plurality spatial phase modulation elements.

Claim 43 (new): The FSO laser communication system of claim 42, wherein said spatial phase modulation panel comprises a deformable mirror.

Claim 44 (new): The FSO laser communication system of claim 35, wherein said spatial modulator is a spatial intensity modulator.

Claim 45 (new): The FSO laser communication system of claim 44, wherein said spatial intensity modulator is realized as a spatial intensity modulation panel having a plurality spatial intensity modulation elements.

Claim 46 (new): The FSO laser communication system of claim 35, wherein said multi-segment detector is a quad-cell detector.

Claim 47 (new): The FSO laser communication system of claim 42, wherein said processor generates spatial phase modulation (SPM) control signals for controlling said spatial phase modulation panel, so as to lock a maximum intensity speckle in the received laser beam carrier signal onto said receiving optical fiber, and achieve a second level of optical signal intensity stabilization at said single-cell signal detector in said receiver module.

Claim 48 (new): The FSO laser communication system of claim 45, wherein said processor generates spatial intensity modulation (SIM) control signals for controlling said spatial intensity

modulation panel, so as to lock a maximum intensity speckle in the received laser beam carrier signal onto said receiving optical fiber, and achieve a second level of optical signal intensity stabilization at said single-cell signal detector in said receiver module.

Claim 49 (new): A method of automatically stabilizing variations in the detected intensity of free-space optical (FSO) laser beam carrier signals caused by atmospheric turbulence in a free-space optical (FSO) laser communication system having at least first and second communication terminals in optical communication by way of a broad-band FSO laser beam communication link supporting signal transmission and reception channels, wherein each said transmission and reception channel has a transmitter module and a receiver module, and wherein each said receiver module includes (i) a receiving aperture for receiving a FSO laser beam carrier signal transmitted from said transmitter module of another one of said communication terminals, along a optical pathway having downstream direction, (ii) a receiving optical fiber, disposed at the end of said optical pathway, for receiving said FSO laser beam carrier signal after transmission along said optical pathway, and (iii) a single-cell signal detector in optical communication with said receiving optical fiber, for detecting the intensity of said FSO laser beam carrier signal and generating an electrical signal corresponding thereto, said method comprising the steps of:

- (a) providing within each said receiver module, a fast steering mirror (FSM), disposed downstream from said receiving optical fiber, for steering said FSO laser beam carrier signal along an optical pathway having a downstream direction;
- (b) providing a beam splitter, disposed downstream from said FSM, and splitting said FSO laser beam carrier signal into a first signal component and a second signal component;
- (c) providing a multi-segment signal detector, disposed downstream from said beam splitter, and detecting the intensity of said first signal component of said FSO laser beam carrier signal, and generating electrical signals corresponding thereto;
- (d) processing signals generated from said multi-segment signal detector, controlling said FSM, and automatically tracking or following a maximum intensity laser beam speckle in said FSO laser beam carrier signal, and moving away from low intensity (i.e. black) laser beam speckles appearing in said FSO laser beam carrier signal and that might fall onto said receiving optical fiber, and thereby achieving a first level of optical signal intensity stabilization at said single-cell signal detector in said receiver module;

(e) providing a spatial modulator, disposed downstream from said beam splitter, and spatially modulating said second component of said FSO laser beam carrier signal; and

(f) further processing electrical signals produced by said single-cell signal detector, controlling said spatial modulator, and spatially modulating said second component of said FSO laser beam carrier signal so as to lock a maximum intensity speckle appearing in the received second component of said FSO laser beam carrier signal, onto said receiving optical fiber, and thereby achieving a second level of optical signal intensity stabilization at said single-cell signal detector in said receiver module.

Claim 50 (new): The method of claim 49, wherein said signal transmission and reception channels are optically-separated.

Claim 51 (new): The method of claim 49, wherein said signal transmission and reception channels are optically-combined.

Claim 52 (new): The method of claim 49, wherein said receiving aperture comprises a telescopic receiving aperture.

Claim 53 (new): The method of claim 49, wherein said transmitter module and said receiver module are realized as separate modules.

Claim 54 (new): The method of claim 49, wherein said transmitter module and said receiver module are realized as a single transceiver module.

Claim 55 (new): The method of claim 49, wherein in step (e), said spatial modulator is a spatial phase modulator.

Claim 56 (new): The method of claim 55, wherein in step (e), said spatial phase modulator is realized as a spatial phase modulation panel having a plurality spatial phase modulation elements.

Claim 57 (new): The method of claim 42, wherein in step (e), said spatial phase modulation panel comprises a deformable mirror.

Claim 58 (new): The method of claim 35, wherein in step (e), said spatial modulator is a spatial intensity modulator.

Claim 59 (new): The method of claim 58, wherein in step (e), said spatial intensity modulator is realized as a spatial intensity modulation panel having a plurality spatial intensity modulation elements.

Claim 60 (new): The method of claim 49, wherein in step (c), said multi-segment detector is a quad-cell detector.

Claim 61 (new): The method of claim 56, wherein in step (e), said processor generates spatial phase modulation (SPM) control signals for controlling said spatial phase modulation panel, so as to lock a maximum intensity speckle in the received laser beam carrier signal onto said receiving optical fiber, and achieve a second level of optical signal intensity stabilization at said single-cell signal detector in said receiver module.

Claim 62 (new): The method of claim 59, wherein in step (e), said processor generates spatial intensity modulation (SIM) control signals for controlling said spatial intensity modulation panel, so as to lock a maximum intensity speckle in the received laser beam carrier signal onto said receiving optical fiber, and achieve a second level of optical signal intensity stabilization at said single-cell signal detector in said receiver module.